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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/287,579	04/06/1999	LE LI	REVEO-9999	6469

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EXAMINER

QI, ZHI QIANG

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 05/08/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/287,579

Applicant(s)

LI ET AL.

Examiner

Mike Qi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 41-92 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 41-92 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 41 and 83 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,749,261 (McLaughlin et al) in view of US 6,172,720 (Khan et al).

Claims 41 and 83, McLaughlin discloses (col.4, lines 44-47; col.5, lines 28-47; col.8, lines 14-19; Figs. 2-3) that the liquid crystal sunroof (10) includes two transparent surfaces (22,24) and liquid crystal material (26) therebetween, and the circuit (25) is connected by electrical leads (21,23) to electrodes (30,32) positioned on opposite sides or surfaces of the liquid crystal material (26), and operationally, with switch (29) open or close to control the field-off state or field -on state of the light transmissive characteristics of the sunroof (10) or window (100) of the liquid crystal (26), and generally, when the liquid crystal material is in the field-on state the light should be transmission, when the liquid crystal material is in the field-off state the light should be scattering, and that the sunroof or window are glazing panel.

McLaughlin does not expressly disclose the liquid crystal material comprises a PSCT liquid crystal material lacking the mesogenic group of the general formula: $[\text{Si}(\text{CH}_3)\text{O}]_n$.

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However, Khan discloses (col.1, lines 17-61) that the stabilized cholesteric liquid crystals have high viscosity which can undesirably increase the response time of these materials when used in electrooptic devices, and exhibits no liquid crystalline phase (i.e., using a polymer which does not have the mesogenic group, i.e., the polymer does not have the liquid crystalline phase) will substantially lower the viscosity of the liquid crystal material, so as to improve the properties such as higher contrast ratio, shorter response time and lower voltages.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use a polymer lacking the mesogenic group as claimed in claims 41 and 83 for achieving haze-free, shorter response time and wide viewing angle.

3. Claims 46, 51, 84 and 85 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,749,261 (McLaughlin et al) in view of US 4,961,532 (Tangney).

Claims 46, 51, 84 and 85, McLaughlin discloses (col.4, lines 44-47; col.5, lines 28-47; col.8, lines 14-19; Figs. 2-3) that the liquid crystal sunroof (10) includes two transparent surfaces (22,24) and liquid crystal material (26) therebetween, and the circuit (25) is connected by electrical leads (21,23) to electrodes (30,32) positioned on opposite sides or surfaces of the liquid crystal material (26), and operationally, with switch (29) open or close to control the field-off state or field -on state of the light transmissive characteristics of the sunroof (10) or window (100) of the liquid crystal (26), and generally, when the liquid crystal material is in the field-on state the light should be transmission, when the liquid crystal material is in the field-off state the light should be scattering, and that the sunroof or window are glazing panel.

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McLaughlin does not expressly disclose the liquid crystal material comprises Ethylen Glycol Dimethacrylate (EGD).

However, Tangney discloses (col.3, lines 52-53) that the Ethylene Glycol Dimethacrylate (EGD) is a typical monomer, and that was common and known in the art as using a monomer material such as Ethylene Glycol Dimethacrylate (EGD) or combinations to make a liquid crystal material. Such material are commercially available from the public market, and anyone skilled in the art can use such known material. Besides, the UV10, UV15-7 are trade marks that does not contain any substantial limitation (does not contain any technical feature), and that are only given weight as intended use.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use such known material as claimed in claims 46, 51, 84 and 85 to make the liquid crystal material.

4. Claims 56, 61, 86 and 87 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,749,261 (McLaughlin et al) in view of US 6,049,366 (Hakemi et al) and US 4,097,130 (Cole, Jr).

Claims 56 and 86, McLaughlin discloses (col.4, lines 44-47; col.5, lines 28-47; col.8, lines 14-19; Figs. 2-3) that the liquid crystal sunroof (10) includes two transparent surfaces (22,24) and liquid crystal material (26) therebetween, and the circuit (25) is connected by electrical leads (21,23) to electrodes (30,32) positioned on opposite sides or surfaces of the liquid crystal material (26), and operationally, with switch (29) open or close to control the field-off

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state or field -on state of the light transmissive characteristics of the sunroof (10) or window (100) of the liquid crystal (26), and generally, when the liquid crystal material is in the field-on state the light should be transmission, when the liquid crystal material is in the field-off state the light should be scattering, and that the sunroof or window are glazing panel.

MeLaughlin does not expressly disclose the liquid crystal material comprises a PSCT liquid crystal material and a dichroic dye.

However, Hakemi discloses (col.1, lines 26-63) that using PSCT (polymer stabilized cholesteric texture) has advantages: (1) haze-free normal-mode and reverse-mode shutters (compared to PDLC); (2) simplicity of fabrication by eliminating the polarizers and dyes (compares to LCD); (3) low voltage requirement (compared to PDLC); and (4) bistability (compared to LCD and PDLC), and as the concentration of polymer gel is low, there will be no index mismatching and the shutter in the On-state is transparent in all viewing direction (haze-free).

Cole, Jr discloses (in abstract) that a dichroic dye for absorbing an additional wavelength (color) of visible light can be selectively actuatable, so that different combination of visible light wavelengths are absorbed to change the color of light transmitted through the display. Therefore, using dichroic dye, the different combinations of visible light wavelengths are absorbed to achieve a color change of light transmitted through the display.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use PSCT liquid crystal material and a dichroic dye as claimed in claim 56 and 86

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for achieving haze-free and a color change of light transmitted through the display.

Claims 61 and 87, the material of the dichroic dye such as D5, D35, D52 and combinations were common and known in the art as such material are commercially available from the public market. The D5, D35, D52 are trade marks that does not contain any substantial limitation (does not contain any technical feature), and that are only given weight as intended use.

5. Claims 62 and 88 are rejected under U.S.C. 103(a) as being unpatentable over US 4,749,261 (McLaughlin et al) in view of US 4,579,422 (Simoni et al).

Claims 62 and 88, McLaughlin discloses (col.4, lines 44-47; col.5, lines 28-47; col.8, lines 14-19; Figs. 2-3) that the liquid crystal sunroof (10) includes two transparent surfaces (22,24) and liquid crystal material (26) therebetween, and the circuit (25) is connected by electrical leads (21,23) to electrodes (30,32) positioned on opposite sides or surfaces of the liquid crystal material (26), and operationally, with switch (29) open or close to control the field-off state or field -on state of the light transmissive characteristics of the sunroof (10) or window (100) of the liquid crystal (26), and generally, when the liquid crystal material is in the field-on state the light should be transmission, when the liquid crystal material is in the field-off state the light should be scattering, and that the sunroof or window are glazing panel.

McLaughlin does not expressly disclose the liquid crystal material for an electro-optical glazing structure comprises a surfactant.

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However, Simoni discloses (col.3, lines 4549; Fig.2) that in order to obtain a good planar orientation of the cholesteric mixture (1), the glass plates (2,2') were repeatedly immersed in a 1% solution of a polymer surfactant. Such that the mixture is a liquid crystal material, so that the surfactant also immersed into the liquid crystal material, and the liquid crystal material comprises a surfactant in order to obtain a good planar orientation of the cholesteric mixture. *(enhancing panel uniformity, decrease flow streaks)*

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use surfactant as claimed in claims 62 and 88 for achieving a good planar orientation of the cholesteric mixture and improving the smoothness of the layer.

6. Claims 67 and 89 are rejected under 35 U.S.C. 103(a) as being unpatentable over McLaughlin and Simoni as applied to claims 62 and 88 above, and further in view of US 6,022,547 (Herb et al) .

Claims 67 and 89, Herb discloses (col.20, lines 29-41) a dimethylsiloxane polymer as the surfactant. Using Poly (Dimethylsiloxane) as the surfactant was common and known in the art, and that would have been at least obvious..

7. Claims 68-71, 73-76 and 90-91 are rejected under U.S.C. 103(a) as being unpatentable over US 4,749,261 (McLaughlin et al) in view of US 5,691,795 (Doane et al).

Claims 68, 73 and 90-91, McLaughlin discloses (col.4, lines 44-47; col.5, lines 28-47; col.8, lines 14-19; Figs. 2-3) that the liquid crystal sunroof (10) includes two transparent surfaces (22,24) and liquid crystal material (26) therebetween, and the circuit (25) is connected by electrical leads (21,23) to electrodes (30,32) positioned on opposite sides or surfaces of the liquid

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crystal material (26), and operationally, with switch (29) open or close to control the field-off state or field -on state of the light transmissive characteristics of the sunroof (10) or window (100) of the liquid crystal (26), and generally, when the liquid crystal material is in the field-on state the light should be transmission, when the liquid crystal material is in the field-off state the light should be scattering, and that the sunroof or window are glazing panel.

McLaughlin does not expressly disclose the liquid crystal material comprises a photo initiator such as 2,6-Di-tert-butyl-4-methylphenol and the PSCT liquid crystal material comprises a chiral additive such as CB15.

However, Doane discloses (in Example 9) that the polymer stabilized liquid crystal material was prepared from certain amount of chiral agent and photo-initiator to polymerize the monomer, i.e., the polymer stabilized liquid crystal material comprises chiral additive such as CB 15 and photo initiator, and under the UV light irradiation would form the polymer stabilized liquid crystal material. Using CB15 as the chiral additive and using methylphenol as the photo initiator was common and known in the art as the products are commercially available from the public market, and that are only given weight as intended use..

Therefore, it would have been obvious to those skilled in the art at time the invention was made to use chiral additive and photo initiator as claimed in claims 68, 73 and 90-91 for forming the PSCT liquid crystal material.

Claims 69-70, 74-75, Doane discloses (col. 6, line 64- col.10, line 60, and in Figs 1-3) that the polymer-liquid crystal material (electro-optical glazing structure) is light scattering (total-

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scattering mode) in a field-OFF condition and optical clear (total-transmission mode) in a field-ON condition. An AC voltage source (17) controls the polymer domains in order to switch the cell between different optical states, and it does not need to use any energy absorbing mechanisms, such that the operation mode can be electrically-activated or switched, i.e., in the field-OFF condition the material is strongly light scattering (total-scattering), and when the fields turned on the material is optically clear (total-transmission), and the cell is haze free at all viewing angles.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to operate in the scattering mode and transmission mode as claimed in the claims 69-70, 74-75 for achieving haze free at all viewing angles used as an optical glazing panel.

Claims 71 and 76, Doane discloses (col.3, line 66-col.4, line 18) that the wavelength of the light that is reflected by the material is given by the relation $\lambda=np$ (n is the average reflective index, p is the pitch length), and the wavelength is above infra-red and below ultra-violet, i.e. a broad band electromagnetic spectrum of operation including the UV light, infra-red or visible light, and that was common and known in the art to tailor the band to the required application, and therefore it would have been obvious in the device of Doane to employ a wide band including near-IR, visible and near-UV in order to tailor the operation to the band required for any given application.

8. Claims ~~45, 50, 55, 66, 72, 74, 78, 82~~ and 92 are rejected under U.S.C. 103(a) as being unpatentable over US 4,749,261 (McLaughlin et al) in view of US 6,049,366 (Hakemi et al).

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Claims 78 and 92, McLaughlin discloses (col.4, lines 44-47; col.5, lines 28-47; col.8, lines 14-19; Figs. 2-3) that the liquid crystal sunroof (10) includes two transparent surfaces (22,24) and liquid crystal material (26) therebetween, and the circuit (25) is connected by electrical leads (21,23) to electrodes (30,32) positioned on opposite sides or surfaces of the liquid crystal material (26), and operationally, with switch (29) open or close to control the field-off state or field -on state of the light transmissive characteristics of the sunroof (10) or window (100) of the liquid crystal (26), and generally, when the liquid crystal material is in the field-on state the light should be transmission, when the liquid crystal material is in the field-off state the light should be scattering, and that the sunroof or window are glazing panel.

McLaughlin does not expressly disclose the liquid crystal material comprises a low molecular weight nematic liquid crystal material.

However, Hakemi discloses (col.19, line 23-col.20, line 22) that making a polymer stabilized liquid crystal composite containing a low molecular weight liquid crystal material, and such films can work as a reverse mode shutter and a normal mode shutter, and the transparent state is haze free for all directions of incident light. Using K-series, M-series, E-series, ZLI-series, E7, P9615A such liquid crystal as the low molecular weight nematic liquid crystal material was common and known in the art as the products are commercially available from the public market. Besides, the K-series, M-series, E-series, ZLI-series, E7, P9615A are trade marks that does not contain any substantial limitation (does not contain any technical feature), and that are only given weight as intended use.

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Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use a liquid crystal material comprises a low molecular weight nematic liquid crystal material as claimed in claims 78 and 92 for achieving bistable properties and haze free for all directions in the transparent state.

8. Claims 42-44, 47-49, 52-54, 57-59, 63-65, 79-81 are rejected under 35 U.S.C. 103(a) as being unpatentable over McLaughlin and Khan, Tangney, Hakemi, Cole, Jr and Simoni as applied to claims 41, 46, 51, 56, 62, 78 and 88 above, and further in view of US 5,691,795 (Doane et al).

Claims 42-43, 47-48, 52-53, 57-58, 63-64, 79-80, Doane discloses (col. 6, line 64- col.10, line 60, and in Figs 1-3) that the polymer-liquid crystal material (electro-optical glazing structure) is light scattering (total-scattering mode) in a field-OFF condition and optical clear (total-transmission mode) in a field-ON condition. An AC voltage source (17) controls the polymer domains in order to switch the cell between different optical states, and it does not need to use any energy absorbing mechanisms , such that the operation mode can be electrically-activated or switched, i.e., in the field-OFF condition the material is strongly light scattering (total-scattering), and when the fields turned on the material is optically clear (total-transmission), and the cell is haze free at all viewing angles.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to operate in the scattering mode and transmission mode as claimed in the claims 63-64 for achieving haze free at all viewing angles used as an optical glazing panel.

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Claims 44, 49, 54, 59, 65, 81, Doane discloses (col.3, line 66-col.4, line 18) that the wavelength of the light that is reflected by the material is given by the relation $\lambda=np$ (n is the average reflective index, p is the pitch length), and the wavelength is above infra-red and below ultra-violet, i.e. a broad band electromagnetic spectrum of operation including the UV light, infra-red or visible light, and that was common and known in the art to tailor the band to the required application, and therefore it would have been obvious in the device of Doane to employ a wide band including near-IR, visible and near-UV in order to tailor the operation to the band required for any given application.

9. Claims 45, 50, 55, 60, 66, 72, 77, 82 are rejected under 35 U.S.C. 103(a) as being unpatentable over McLaughlin and Khan, Tangney, Hakemi, Cole, Jr and Simoni as applied to claims 41, 46, 51, 56, 62, 78 and 88 above, and further in view of US 5,667,897 (Hashemi et al).

Claims 45, 50, 55, 66, 72, 77, 82, Hashemi discloses (col.1, lines 49-51) that float-glass processing is the conventional way of producing sheet glass, used for automotive and architectural uses, throughout the world.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use float-glass substrates as claimed in claims 45, 50, 55, 60, 66, 71, 77, 82 for producing sheet glass.


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Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (703)308-6213 .

Mike Qi
April 24, 2002


TOANTON
PRIMARY EXAMINER